

A CRITICAL APPRAISAL OF THE ECONOMIC ASPECTS OF THE PROPOSED
BEAUFORT SEA DEVELOPMENT

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The objective of producing oil from the Beaufort Sea region is consistent with the national interests. These goals include attaining oil self-sufficiency by 1990, creating new employment opportunities and encouraging regional development. (1/1.2-1.3)

Throughout the several volumes of the 1982 environmental impact statement (EIS) of the Beaufort Sea-Mackenzie Delta Hydrocarbon Development Proposal appear three distinct rationale for undertaking the project: 1) provision of national energy self-sufficiency; 2) production of net national economic benefits; and 3) promotion of regional economic development, generally throughout the nation, and particularly in the northwest territories. Each of these objectives is critically reviewed in turn in this report, with major emphasis placed on the latter two.

1.0 THE BEAUFORT SEA DEVELOPMENT AS AN ENERGY SELF-SUFFICIENCY STRATEGY

Given the national goal of "self-sufficiency in oil within a decade," the Beaufort sea project could constitute an important step toward fulfillment of this objective. However, two major concerns may be expressed. First, given the historic instability of international cartels in general and current signs of the dissolution of OPEC in particular, the likelihood of the goal of national self-sufficiency in oil remaining a critical political objective throughout the 80's and 90's becomes somewhat questionable. Security emphasis might shift to, say, the strategic mineral imports now under review by Emergency Canada. If self-sufficiency in oil does remain a national priority, there is also the possibility that the time frame for its achievement will be moved forward and/or that the particular target of zero imports will be relaxed.

In addition to the questions raised by fissures in the OPEC cartel, a second development to which attention might be directed is the discovery of potentially sizeable oil reserves off the Canadian eastern coast. These reserves, being eminently more accessible, seriously call into question the Beaufort Sea Development as the most economically efficient means of achieving the goal of oil self-sufficiency.

The very nature of the above questions precludes, of course, readily supplied answers. In reviewing the EIS, lengthy speculation regarding these matters is probably of limited relevance. The purpose of raising such questions is merely to caution against uncritical acceptance of the Beaufort Sea

project as a unique or priority measure toward fulfilling the goal of total national self-sufficiency in oil by 1990.

2.0 THE BEAUFORT SEA DEVELOPMENT AS A NATIONAL ECONOMIC STIMULUS

In regard to the project's contribution to net national economic benefits, there are at least five significant points which may be raised.

2.1 Estimation of Economic Impacts

There is very little information in the report as to how the net benefits to Canada from the Beaufort project were calculated. In particular, the economic assumptions that underly the Informetrica TIM model, and the model's conjunctive use with (presumably) the multiregional input-output model of the Department of Regional Economic Expansion, are not spelled out. It is explained that:

The development scenarios are simulated with the Beaufort Canadian Benefits Planning Model (Beaufort Planning Model). This model incorporates geological and technical information on Beaufort development activities, and translates these into demand forecasts for personnel, materials, and services. The Beaufort Planning Model further generates a corresponding supply forecast. A description of the Planning Model, computer printouts and other summary tables are provided as a support document to this volume (Dome, 1982). (2/7.2)

The Planning Model documentation referred to above does little more than reproduce the output of a simulation model. Of the more than 500 pages in the document, only 8 are devoted to listing technical assumptions of the model. The remaining pages are reproductions of computer printout. No economic assumptions

or relationships are presented. Nor is there discussion of the relative importance of each of the technical assumptions listed. That is, there is no "sensitivity analysis" of the influence of each assumption on the model's output. Also absent is any discussion of the structure of the model or tests of its validity. In view of the well-known weaknesses of large-scale simulation models, some discussion of these problems (sensitivity analysis, model structure, and validity tests) would seem to be appropriate.

The demand forecasts of the Beaufort Planning Model for personnel, materials and services and the corresponding supply forecasts are used as inputs to an econometric model (TIM) to produce a set of scenarios of the national economy, with and without the Beaufort Regional Development. An unidentified group of consultants is employed to estimate national economic benefits (as well as regional and industrial benefits) for these scenarios.

The following represents the entirety of the discussion of the TIM model and the interaction between the BPM and TIM:

The benefits of Beaufort development are reported for the years 1981 to 2000. National and regional economic benefits are measured by key indicators for the technically achievable case. These benefits include the "multiplier effect" of the Beaufort investment stimulus. Informetrica Limited of Ottawa (Informetrica) provided the economic analysis of these effects using the resource requirements calculated by the Beaufort Planning Model as the basic data for its work. The analysis illustrates incomes, jobs, revenues, and other economic benefits resulting from this development. A group of regional consultants assisted Informetrica in assessing the regional effects in terms of employment and incomes generated. (2/7.2)

The Canadian economic impacts are measured by an econometric model of Canada called TIM, developed by Informetrica. The model incorporates more than 4000 variables measuring economic activity, determines production in 23 sectors, and utilizes input/output tables to link demand and supply. Data on Beaufort development is provided to TIM by the Beaufort Planning Model. (2/7.3)

Given the limited extent of the discussion, the reader is left with little alternative but to accept on good faith the reasonableness of the figures reported.

2.2 Determination of Net Benefits

The cost-benefit analysis (CBA) in the report suffers from the same lack of detail as does the discussion of BPM and TIM. It would be helpful to the reader to have tables listing the major categories of both benefits and costs, their respective time streams, and some discussion of the determination of each category. In its present form, the section of EIS entitled "Types of Benefits and How They Are Measured" (including Figure 2/7.1-3) occupies something less than one full page, with minimal documentation of the CBA procedures adopted. (2/7.2-7.3)

2.3 Determination of Project Costs

In addition to lack of detail regarding the cost data utilized for the CBA, no dollar estimates are reported for any project-associated environmental costs, costs of putting into place public infrastructure (e.g., transportation and communication networks, sewerage, schools, hospitals), costs of job-training, or of any other social programs to improve regional participation or to mitigate adverse regional effects.

All such costs are excluded from the CBA determination of net economic benefits.

These results suggest that for the range of Beaufort development considered the project is a net benefit to Canada....The appraisal does not include the benefits of improved infrastructure in the north, extended communication links, upgraded social and health services, and training facilities. As well, social, environmental and infrastructure costs have not been included. (our emphasis--2/7.10)

One can only speculate as to the net benefits of the project were such costs included in additional sets of social CBA calculations.

The exclusion of such costs (and associated benefits) are of primary concern. All mitigation measures considered in the report are assumed to be "minor" in magnitude. Any major environmental or social disruptions and their resulting costs are simply not considered.

Throughout the assessment, it was assumed that mitigative impacts of various development components were an integral part of the development and would be employed to the extent feasible. Consequently, unless otherwise indicated, all statements of degree of possible impact refer to residual impact.
[proponents' emphasis] (4/1.3)

it would of course be unrealistic to undertake an EIS under the assumption that no precautionary measures against critical adverse circumstances were in place prior to or during the development. As it stands, however, the report appears to ignore in its CBA calculations the costs of the very precautionary or mitigative measures that it assumes have been adopted as an integral part of the development. It would arguably prove useful to the reader to have within the report

attempts to cost the damages and mitigation measures for one or two major such disruptions to see the resulting effects on the net national benefits figures.

2.4 Canadian Sourcing

Canadian sourcing is an important issue in that the net benefits of the proposed project are directly dependent on the proportion of Canadian content of the flow of supporting production.

The key to achieving strong Canadian benefits in Beaufort development lies with the extension of the capability of Canada's industrial infrastructure to meet Beaufort demand. The current level of Canadian content for Beaufort activities is in the 75% range...For a pipeline based development scenario, overall Canadian content to the year 2000 for materials and services would approach 86%; for a total marine scenario it would be 79%....Canadian content profiles representing an aggressive industrial expansion program are incorporated in the Beaufort Planning Model. (2/7.6-7.7)

It appears that for purposes of estimating net national benefits of the project, the "aggressive expansion program" figures of 79% and 86% Canadian content were adopted. For comparison, the effects on net national benefits of the estimated present Canadian content of 75% might have been presented.

An additional concern is the basis of estimation of the "75% range" of current Canadian content. No explanation is given as to how this figure was obtained. Was the national I-O table employed? Was Informetrica's TIM model used? The report provides no discussion of the methodology adopted.

2.5 Estimation of Multiplier Effects

Beaufort Region development will create 11,000 to 13,000 direct jobs by 1990. (2/7.5) Up to 200,000 to 240,000 new jobs (direct, indirect, and induced would be created in Canada from Beaufort Sea development annually from 1989 to 1995. (2/7.7)

Defining the multiplier in the conventional manner, as the total jobs generated per direct job created, the employment multiplier applied to the Beaufort project falls in the range 15.4

($200,000/13,000$) to 21.8 ($240,000/11,000$). That is, for every one person that would be employed directly on the project, it is estimated that there would be on average 15 - 22 additional jobs created through indirect and induced effects. The indirect jobs would be in those industries involved in supplying goods and services to the project. The induced jobs would occur in industries (primarily trades and services) which provide the consumer commodities purchased from the increased incomes generated by the project.

The multiplier value is an extremely important figure as its magnitude is critical in the determination of net national benefits. Obviously, the higher the multiplier, the greater are the estimated net national benefits associated with the project. The question thus arises, is the employment multiplier with a minimum value of 15.4 reasonable? In view of existing empirical evidence, it is difficult to respond positively to this question. For example, the "type II" employment multiplier (direct + indirect + induced employment/direct employment) for the 1977 U.S. Crude Petroleum sector is 11.0. Given that the U.S. economy is less subject to import leakages than is the Canadian economy, one would expect a higher multiplier to be

associated with the U.S. petroleum sector. The 15.4 - 21.8 range of the Beaufort multiplier clearly needs some explanation.

2.6 Regional Multipliers

As with the national employment multipliers discussed above, regional employment multipliers are sufficiently high to warrant explanation. For example, the type II employment multiplier (direct + indirect + induced employment/direct employment) for Ontario appears to be approximately 12.0 (60.0/4.0 as read from Figure 7.3-5, Vol.2). The Quebec multiplier is even higher, exceeding a value of 30 (42.0/1.33).

For purposes of comparison, in the 1977 454-sector California input-output model, the maximum type II employment multiplier is 11.1 (Rice Milling). It is to be noted, however, that the California multipliers are derived from a regional I-O model, while the Ontario and Quebec aggregate multipliers are constructed from a multiregional I-O model and thus incorporate interregional feedback effects through trade relationships between the provinces. These latter effects would explain to some degree why the multipliers are higher, but multipliers of such magnitude still demand some discussion.

3.0 THE BEAUFORT DEVELOPMENT AS AN AGENT OF REGIONAL DEVELOPMENT

In assessing the particular economic effects of the oil and gas development on "Northerners" we must be clear whether it is the pre-project 7,000 residents, or the post-project 20,000 or 30,000 anticipated residents, to whom we are referring. The EIS is generally obscure about this, though it recognizes that one

of the outcomes of the project may be to transform the native people from being a majority to being a minority of local residents. For purposes of discussion in this section, we assume that it is the pre-plan long-term residents, and especially the native population, with whom we are concerned. These we shall refer to as Northerners, as against others whom we shall refer to as newcomers.

3.1 Economic Development Effects for Northerners

While economic stimulus to regional development in various parts of Canada can be plausibly projected in terms of specific demands and supply responses for materials and services in which these regions already have established facilities and capabilities, the magnitudes of such long-term "development effects" to be expected for the region itself are more dubious and questionable.

Staple-led regional growth, based upon a single non-renewable resource -- sometimes called "bonanza development" -- almost inevitably follows a trajectory of boom and bust. The economic history of the region, contained in EIS Vol. 5, documents local experience with such spurts of short-lived stimulus arising from the Klondike Gold Rush, the early whaling era, the subsequent fur trade boom, and the construction booms associated with building the DEW line, the Dempster Highway and the government centre at Inuvik. Only the last of these -- based on public subsidy, not a local resource base -- has continued to inject purchasing power and employment support into the region. The EIS reports some local concern that the current

proposal might also involve such a one-shot and temporary stimulus.

Bonanza development is characterized by a frenetic phase of "good times," when construction of specific-purpose infrastructure, processing and transshipment facilities, creates an employment boom, high wages, in-migration, housing and urban construction, service amenities, and secondary local production activities. This is then followed by a plateau or turning point as the resource is depleted, and a gradual or an abrupt falling off and eventual disappearance of the primary stimulus, leaving behind abandoned or underutilized infrastructure, diminished or ghost-town communities, and a generally depressed and deflated economy. The pattern is a familiar and distinctive scenario in Canadian economic history.

For staple-led growth to be continuous or "self-sustaining" it must generally be blessed with one of three situations:

(a) a renewable resource base capable of on-going productivity increase (i.e. a capacity to expand output continually, and a sufficiently bouyant demand and absence of competitive supply to keep operations profitable);

(b) a diversified resource base permitting investment and employment to shift from one staple to another as each runs out of steam, plus the entrepreneurial ability to recognize, develop, and successfully jump from one "horse" to another at the right moment;

(c) locational advantages for establishing an industrial or commercial base, utilizing resources from other regions which are managed, transshipped, and/or processed to higher value-

added by the skilled workforce and associated capital at this location.

Although data contained in the EIS and other sources are limited and incomplete, it seems doubtful whether the immediate region has either the renewable or the diverse resource base necessary to inspire hope for such self-sustaining staple-led development, and it seems certain that it lacks the locational advantages required for it to become a viable industrial or commercial centre. The EIS provides a scenario for a period of strong economic growth, but not necessarily a strategy for permanent and sustained regional development. Some discussion as to precisely what constitutes the pre-project northern industrial base and just how it is expected to expand and develop would be most useful.

Given the proven, if still rather indefinite, reserves of oil and gas, and other possible non-renewable resources which might be discovered, the "optimum strategy" from the viewpoint of making maximum potential contribution to local incomes and employment (as distinct from national economic and other possible criteria) would be to choose a steady rate of extraction, avoiding excessive boom conditions, over-building, and immigration, and spreading the benefits over as long a time period as possible. This is especially the case if one takes the interests of unborn generations of descendants into account, and if one expects the price of the non-renewable resource to rise in real terms over time. Taking account of the need to recoup costs of exploration and cover costs of some minimum technically feasible infrastructure plus normal incentive

profits, a sensible target rate of production would be that which raises local levels of real income to levels commensurate with, or slightly ahead of, those in the rest of Canada (including some steadily rising aspirations over time).

The Mackenzie Delta and Beaufort Sea communities, however, do not have the autonomy or sole and exclusive rights to decide how local resource endowments should be used to maximize local benefits. Ownership of the resource base, under prevailing Canadian law, rests with the Federal Government, which has a responsibility to determine its "optimum use" to benefit all Canadians as it interprets their interests. An important component of these interests, however, is recognized to be the current and future well-being of local residents and their descendants, and it is thus relevant to assess costs and benefits from this particular viewpoint. Local interests then have to be weighed against possible conflicting interests and priorities of other regions of the country.

Discounting the possibility that the envisaged Beaufort Sea oil and natural gas exploitation will be the harbinger of general and sustained diversification of economic activity, and assuming that rates of extraction take place at the "high" (technically feasible) or the "intermediate" levels, what types of benefit can be expected to accrue to local long-term residents? There is considerable discussion of this in the EIS which is worth commenting upon. Following the categories of benefit identified in the EIS, the commentary will be divided into (a) employment effects, (b) income effects, (c) business opportunities, and (d) broader socio-economic effects. The EIS

recognizes both positive and negative effects, but sees the overall impact as clearly positive. The present discussion will not presume to make its own subjective assessment of overall net benefit. It accepts that positive benefits are adequately presented in the report, and will mainly provide a critical appraisal of the calculations, assumptions, and expectations contained in the EIS. This in no way implies that these projections are misleading, or intended to mislead, but seeks merely to "play the devil's advocate" to probe the assumptions and information on which they are based.

The time frame of the EIS is 1981-90 and 1981-2000, with no projection or prognostication beyond the year 2000. During this period, the oil boom is accelerating to a plateau of presently unknown duration beyond 2000. Conventional time discounting of future benefits and costs (by analogy with private profitability) would discount to zero all effects beyond 20 years or so, at any likely chosen rate of discount. It is questionable whether such an approach is appropriate to "community development planning" wishing to take account of interests of future generations, but it is generally defended on the grounds of uncertainty as to future settlement patterns, social requirements, technologies likely to be available, resource discoveries and other livelihood support which cannot presently be foreseen. Having recognized this proviso, the present commentary accepts the time frame to year 2000 as the context within which benefits and costs to local residents (and other Canadians) are to be assessed for purposes of the EIS.

3.2 Employment Effects for Northerners

The EIS foresees that "regional economic and employment effects of Beaufort development will be pronounced in the north, and more specifically in the Beaufort Region and the Mackenzie Delta" (2/7.15). It projects, somewhat ambiguously, "Total northern employment of 4,500 to 7,000 jobs by 1990 and 12,000 jobs by the year 2,000" (1/1.26). However, 80% of direct employment requirements will be serviced by 2-3 week rotation of staff who will reside elsewhere in Canada. Of the remaining 20%, most will apparently be newcomers coming specifically to accept Industry employment, so that direct employment effects for long-term residents and especially for native people appear to be expected to be a small proportion of the total.

It is forecast that 3,000 to 4,000 Beaufort employees will reside in the north by 1990. This could increase to 5,000 to 7,000 Beaufort employees by the year 2000. ...Direct salaries and wages are forecast to total \$1.5 billion to \$2.1 billion (1981 dollars) over the period to 2000. This income will be redistributed in the region for such items as housing, food and transportation. As the region's industrial base expands, more and more of the income received by the employees will remain in the north. (2/7.15)

Several concerns arise from the above statements. First, it would be useful to have some discussion of the potential matching of the project's manpower requirements to a labor profile of the northern region. What categories of jobs and how many of each will become available to local residents over what time period? Table 7.4-1 (Vol.2) lists 29 occupational categories that will be in demand, but provides no discussion of their suitability to local labor. Several of the categories

listed (e.g., geologists, geophysicists; engineers, technicians; supervisors, administrators) are clearly destined to be filled by non-residents. A fuller analysis is needed of the types of skill that are required and the extent to which union membership and other potential obstacles (e.g., age, sex, ethnicity, formal education, transportation) may prevent locals from obtaining jobs consonant with their skills. Again, a more detailed outline of specific measures which Industry would be committed to undertake to upgrade the skills of the local residents and to overcome any other barriers to employment needs to be spelled out.

Capital intensive projects such as this generally have sizeable ratios of construction phase employment to operation phase employment. Construction employment typically builds to a peak and then drops significantly to that of the operation phase. This cycle of boom and decline can occur in a relatively short period of time. Rational planning for commercial expansion in the private sector and for an increased delivery of services in the public sector is very much dependent on knowledge of the time streams of employment and population. For planning purposes estimates of the timing of any mass departure of construction workers can be as important as the estimates of the timing of a mass influx. High and low time-stream estimates of employment effects for local residents would also be of considerable utility in any attempt to plan for and to evaluate the benefits of the impacts of the project on the northern region.

Statements on employment of local people are often unclear,

and at times seem inconsistent; for example, we have the following selection:

"Northerners will have the first consideration for jobs and the provision of goods and services to the extent of their capabilities." (2/7.2)

"the demand for employees residing in the north will in essence provide jobs for every person who has a desire to work in the Industry." (2/7.15)

"the average functional education level of the native people in the Beaufort Sea labour force is so low that only a small number of people are able to make use of the employment and training opportunities currently available... Government, industry, and local businesses are already employing most of the native people who are interested in, and able to fill, wage employment positions." (5/3.7)

Any significant improvement in employment prospects is thus predicated upon provision of, and substantial attitudinal change toward, educational upgrading and vocational training, which will involve much effort, empathy, time and money. Elsewhere, the EIS talks of utilizing rotational and part-time employment schedules for native people, to allow them if they wish to continue traditional occupations such as hunting and fishing. This is somewhat hard to square with the considerable individual and social investment in education and skill enhancement that is called for, which may not pay off for part-time or occasional employment.

The main job creation for native and other local people seems to be envisaged in local retail stores, banks, garages, and other service sector employment. Employment in these areas may not enjoy an equivalent boost in salary levels as direct Industry employment, which thus may have the effect of further

institutionalizing a "dualistic" labour force and salary structure, leaving those on the periphery in a possible "third" or further "marginalized" position. The prime employment positions likely to be in short supply, such as "engineers, welders, insulators, electricians, marine officers and crew, shipyard welders and pipefitters" (2/7.8) seem unlikely to be filled from the Beaufort Sea labour force.

It is possible that, given the lure of job opportunities and high wages to younger and mobile job seekers elsewhere in Canada, the net effect might even be to worsen occupational prospects for local people. The supply response might exceed the demand requirements in accessible types of employment. This is consistent with labour migration models and experience, especially in a context of generally underemployed labour conditions in the economy as a whole. The job displacement effect might even extend to such occupations as bank tellers, store clerks, restaurant and catering personnel, etc., as the disappointed newcomers settle for whatever local jobs might be available, and offer higher job qualifications even for unskilled work customarily accessible to native people.

3.3 Income Effects for Northerners

Again by a process not altogether clear, the EIS states that "salaries and wages received by Beaufort employees residing in the region ... are forecast to total \$1.5 billion to \$2 billion (1981 dollars) over the period to 2000." (2/7.15) and from this is derived some multiple for total local income effect. A major data gap in the EIS, however, is the lack of

information on local income and salary scales: "It had originally been hoped to develop series on community incomes, expenditures, and activity patterns, especially for the Beaufort Sea region, but this did not prove feasible during the time available for the preparation of this EIS." (5/1.6) It is thus difficult to see how income and multiplier projections can be constructed, or estimates made of impact on local livelihood activities.

Income projections suggesting that income to Northerners (in this case, including newcomers) might amount to 25% of total direct wages and salaries generated by the project also seem to be exaggerated. This guesstimate is based on the assumption that the income share is exactly proportional to the projected share in employment, which neglects the fact that a higher proportion of incomes accruing to Southerners is likely to be in the higher occupational categories, and thus to draw down a disproportionate salary component. More careful estimates of local income shares, and also of expected post-project occupational profiles for local long-term residents would certainly seem to be needed.

The wages and salaries that local Industry employees are expected to earn must be considered high, even by unknown local standards. Elsewhere it is reported that "The cash income derived from fur sales by the majority of individual trappers in 1979-80 was less than \$600. Only 12% of all trappers earned \$3,000 or more from trapping" (5/xiv). By contrast, as examples of Industry rates, "crane operators would command over \$40,000 per year and cooks, cooks helpers and supply personnel would

average about \$30,000" (5/xix). It thus seems likely that a polarization of income levels might well be one of the more dramatic outcomes to be expected by local residents from implementation of the project.

Livelihood displacement effects, such as those resulting from expected depletion of caribou and other wildlife herds by newcomer and tourist recreational hunting, are hard to gauge without the needed data on livelihood patterns. "It is impossible to determine the actual numbers of residents that participate in various resource harvesting activities, or the annual harvest of most species, from available data. Most data are of poor and uncertain quality" (5/xiv). "It is difficult to specify levels of biologically acceptable hunting pressure on the various fish and game populations in the region" (5/xv). We are thus flying almost completely in the dark in seeking to assess likely negative income effects upon people striving for a livelihood in the traditional economy, and we are unable to specify what limits should be placed upon recreational hunting to secure these livelihoods.

Negative income effects stemming from inflation are recognized as likely to be significant, even though we have no means for assessing their magnitude or distribution from data or estimates in the EIS. "Public servants and self-employed might find it difficult to meet rising costs and could find their earnings falling behind those of newcomers associated directly with the oil and gas industry" (5/8.15). ... "Some regional residents would probably be less fortunate, however; the old, the disabled, single parents who must look after children,

people with few labour force skills...in the north they are usually synonymous with native people, who are in the large majority among the recipients of social assistance...while their incomes may fluctuate, these incomes tend to rise more slowly than prices, and would rise much more slowly during periods of rapid price escalation. The indigent and unemployable would therefore be the main losers" (5/8.16). As one result of this, more rather than less may have to seek welfare assistance and other income support from government.

3.4 Business Opportunities for Northerners

As mentioned earlier, the basis for projecting likely sourcing impact in the EIS is unclear and ambiguous. If suppliers are to be selected on the basis of "historical sourcing modes" (5/7.2) on the one hand, or "aggressive industrial response" (5/xx) on the other, then giving "first priority" to Northerners may not realize much in the way of local business opportunities. The EIS estimates that about 10% of materials and service needs will originate from Northwest Territory or Yukon suppliers, but no specific figure is given for the immediate region. The list of direct sourcing materials expected to be supplied locally comprises "drilling muds, barite, sand, gravel, fuel oil," which seem unlikely to generate much linkage, value-added, income, or employment effects. Additional business opportunities are listed as "concrete manufacture, prefab buildings, petroleum fuel supply and distribution, catering, banking, ship repair and maintenance, trucking, barging, air freight, parts and recreation" (ibid).

Many local business opportunities would undoubtedly be serviced by branch plants and firms outside the region, working there on contract. For example, the EIS notes that "at least three different types of business could develop or locate in the Beaufort region in response to the industrial market opportunities associated with oil and gas development. These types of businesses are as follows:

- Businesses that offer a sophisticated, high technology service to the oil industry. These businesses are usually branch offices of businesses that operate internationally and the potential for joint ventures with local companies or local groups is usually small. However, they require local office and warehouse facilities as well as various utility and waste disposal services. These needs could be met by local firms.

- Businesses that offer a somewhat less sophisticated service to the oil industry; usually a range of specialized construction, material handling and management skills, and certain specialized equipment such as supply boats and heavy machinery. The potential for joint ventures between such companies and existing or new local firms is good. Businesses of this general type would also require local office and warehouse space and the potential for a local company supplying such facilities is good.

- Businesses that offer basic construction, hauling, expediting maintenance and repair services. Companies often come into a region from other areas to provide such services. However, there is no reason why local firms could not compete with them for oil industry contracts. (5/8.9-8.10)

Realistically, all that these "major business opportunities" seem to offer local businessmen is some construction and maintenance of offices and warehouses, garbage disposal, utility supply and transportation, and miscellaneous repair work.

High and rising costs of materials, office and warehouse space, and wage and salary levels for skilled personnel, will

evidently make it more difficult for local firms to remain competitive relative to firms outside the region, especially if the latter obtain subsidies (or Industry absorbs some of the costs) for transshipment of supplies. Supply problems are likely to be a continuing headache and source of unforeseen cost overruns. As the EIS observes, "local resources will be able to serve as only a small supplement to the large volume of resources that will have to be imported to the region" (5/8.15). "Accommodation shortages and escalating local prices would appear in local costs such as wages which small firms could find more difficult to meet. Many would find it hard to compete with wages offered by the Industry and other large firms" (ibid).

3.5 Broader Socio-Economic Effects for Northerners

There is much discussion of likely positive and negative effects of the projected oil and gas development upon social and environmental aspects, which here will be commented upon only briefly from an economic perspective. Much of the anticipated "negative fallout" in social dislocation, increase in alcoholism, gambling, incidence of crime, and so forth, is familiar from other "frontier development." An abrupt increase in spending power, perhaps especially on an occasional basis (from rotational or part-time employment), with limited opportunity or acquired taste for middle-class lifestyle, together with possible alienation and psychological dislocation in the new urbanized or working situations, makes such excesses almost inescapable. Great strains are put upon the community as a result, and the Industry admits that there is little it can do

directly to mitigate such consequences outside its immediate camps and residencies (5/xxi).

The three-strata income pattern which might be created is also likely to cause rifts between the "haves" and "have-nots" in disbursement of opportunities both between and within groups. Further, as the EIS points out, "native people often tend to concentrate in areas where housing is poor and conditions are crowded. During periods in which a community is growing, housing may be in short supply, increasing the incidence of crowding. In such environments there may also be a relationship between cash income and drinking, and available cash is often spent on liquor, perhaps as a means of temporarily escaping squalid conditions." (5/8.17).

What happens to the "quality of life" in the immediate region depends heavily upon what is done by local authorities and other agencies of government to improve amenities, not simply for law enforcement, social counselling and education, but also in improving the whole social and cultural infrastructure and alternative livelihood opportunities available, especially for youth and those left behind by the principal new income opportunities. It is not known whether it is the intention of the Federal Government to establish something equivalent to the Alberta "Heritage Fund" to earmark part of the royalties and tax revenues from Beaufort oil and gas to secure livelihoods and improve opportunities for Northern residents, but it would seem to be an appropriate recommendation to consider.

The lack of well-formulated strategies for mitigating

adverse socio-economic as well as environmental circumstances are disappointing. There are several expressions, presumably sincere, of good intentions on the part of the Industry but extremely little in the way of specific measures. In the outline of the Industry's responses to socio-economic concerns raised in the report (1/xiii-xiv), the word "encourage" appears no fewer than sixteen times. Mitigative measures based solely on encouragement can easily result in inadequate and ineffective responses to the problems. What specific measures the Industry has in mind in response to the social concerns listed are not reported in detail. The entire question of mitigation is left vague. On this matter we add our concerns to those expressed by several other reviewers.

The anticipated stepped-up responsibilities and expenditure outlays, by local government and community and federal agencies, which are alluded to frequently throughout the report, really need to be pulled together as explicit estimates at some point. It is reported that territorial governments currently disburse between \$4,800 and \$7,200 on an annual per capita basis (2/7.15), and it appears to be implied that the direct income supplements component of this may diminish as direct and indirect employment opportunities improve. As mentioned above, these expectations may prove to be optimistic. In virtually every other dimension of public activity in the region, from social and administrative infrastructure, to education and training, to business subsidies, and wildlife resource management, substantial increments in public expenditure will be called for. The EIS also recognizes that, while the Federal

Government will receive most of the royalties and revenues, the local authorities will have to provide for most of the required increase in social services (5/xxi). These additional public expenditures can be viewed as social costs of the overall project external to the private CBA calculus which establishes the project's commercial profitability.

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